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Topological spin-transfer drag driven by skyrmion dynamics¹ HECTOR OCHOA, SE KWON KIM, YAROSLAV TSERKOVNYAK, Univ of California - Los Angeles — The topological stability of skyrmion magnetic textures can be used to transmit spin signals over long distances. We illustrate this idea in a two-terminal geometry in which a thin film of an insulating chiral magnet is intercalated between two metallic reservoirs. We show how spin-transfer forces induced by spin-polarized currents in the metal pump skyrmion charge into the magnet, sustaining an algebraically-decaying skyrmion flux between terminals. The reciprocal electromotive forces induced by the skyrmion dynamics pumps itinerant spins in the metals. The effect is manifested as a current drag in an open geometry, or equivalently, as a positive magnetoresistance when the circuit is closed in parallel. Spin-transport signatures in lateral heterostructures may be employed to monitor the skyrmion dynamics and characterize the different phases of insulating chiral magnets like Cu₂OSeO₃.

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